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Host IPPP Durham

Position **ESR 3** – Junior ESR (PhD position)

Period October 2014 – September 2017

Funding 16 months from HiggsTools followed by 20 months from University of Durham studentship

Work

- Work package 2
- Task 2.1: Improved predictions for Standard Model-like Higgs scenarios

Supervision

- Supervisor: Nigel Glover (IPPP)
- Co-supervisor: Thomas Gehrmann (U Zurich)
- Secondment to U Zurich

Why?

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LHC running at 13-14 TeV starting in 2015 will produce Higgs bosons in abundance

Copious production of Higgs bosons at large transverse momentum (boosted) allows study of difficult decay channels exploiting this particular kinematics.
Examples: $H \to bb$, $H \to \tau\tau$

The candidate will work on the phenomenology of Higgs Boson production at high transverse momentum. Specifically the NNLO QCD corrections to Higgs production accompanied by a jet in the infinite top mass limit and other state of the art calculations.

What?

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This project will build on previous work in Durham/Zurich in constructing a parton-level NNLO code for H+jet production and from expertise in precision calculations

Aim: state-of-the-art description of boosted Higgs boson production and decay

Collaboration through secondment with University of Zurich

Further opportunities in developing:

- interface with parton shower (UDUR)
- electroweak and finite mass corrections (ALU-FR)
- Interaction with experimental analyses (ATLAS/CMS)

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Host	IPPP Durham
Position	**ESR 1** – Junior ESR (PhD position)
Period	October 2014 – September 2017
Funding	16 months from HiggsTools followed by 20 months from University of Durham studentship
Work	• Work package 3 • Task 3.2: Development and automatization of general next-to-leading order tools
Supervision	• Supervisor: Frank Krauss (IPPP) • Co-supervisor: Stefano Forte • Secondment to DFTTO and ALU-FR

Why?

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LHC running at 13-14 TeV starting in 2015 will produce Higgs bosons in abundance

Production of Higgs bosons in association with b-quarks or through b-quarks in the initial state important in BSM scenarios (enhancement through large tan β).

These channels also somewhat neglected for Standard Model-like scenarios.

The candidate will work on the development and implementation of methods to deal with massive b-quarks in the initial state.

What?

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This project will build on previous work in Durham on NLO subtraction methods (dipole subtraction) and NLO matching with the parton shower.

Aim: Monte Carlo simulation for processes with massive quarks in the initial state at NLO

Secondments with DFTTO and ALU-FR

Further opportunities in developing:

- electroweak Sudakov corrections (ALU-FR, U Zurich)
- Interaction with experimental analyses (ATLAS/CMS)
- Improved treatment of massive initial state particles in the parton shower and their interface with PDFs